New Taxa of Ericaceae from China

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ABSTRACT. Nine new species (*Cassiope membranifolia*, *Gaultheria heteromera*, *G. jingdongensis*, *G. longibracteolata*, *G. pseudonotabilis*, *G. purpurea*, *G. trigonoclada*, *Vaccinium rubescens*, *V. tenuiflorum*), four new varieties (*Enkianthus deflexus* var. *glabrescens*, *Gaultheria dumicola* var. *hirticaulis*, *G. griffithiana* var. *insignis*, *G. wardii* var. *elongata*), a new name (*G. straminea*), and four new combinations (*Enkianthus serrulatus* var. *sichuanensis*, *Gaultheria leucocarpa* var. *yunnanensis*, *G. leucocarpa* var. *psilocarpa*, *G. brevistipes*) are proposed.

As a result of a recent visit to several herbaria in the United States, as well as the examination of additional material that has accumulated in Chinese herbaria since the publication of Fang's (1991) treatment of the Ericaceae for *Flora Reipublicae Popularis Sinicae*, the following novelties are proposed to make the names available for the forthcoming account of the Ericaceae for the *Flora of China*.

Cassiope membranifolia R. C. Fang, sp. nov. TYPE: China. W Yunnan: Lushui Xian, 3600 m, 25 Aug. 1964, *S. G. Wu 8423* (holotype, KUN). Figure 1.

Species nova *C. myosuroidae* W. W. Smith affinis, a quo foliis plerumque suborbicularibus raro ellipticis, dorsis saepe glabris, acuminibus membranaceis laminis aequalibus vel longioribus, 1–2 mm longis differt.

Procumbent slender shrubs. Stems elongated, ca. 26 cm long. Leaves assurgent, densely imbricate on stem, appressed in 4 ranks; leaf blade suborbicular, rarely elliptic, scale-like, 1.2–1.8 × 1–1.5 mm, coriaceous, adaxially concave, glabrous, abaxially not furrowed, convex, glabrous or sometimes pilose at base, base arched, margin distinctly membranous, membranous rim upward forming an elongated-triangular hyaline acumen as long as or longer than blade. Flowers solitary, axillary. Pedicels 1–2.5 cm long, densely crisped-tomentose, base with 3 lacerate bracts; bracteole absent. Calyx purple, glabrous; lobes subfree, oblong, ca. 2.5 mm long, margins membranous, fimbriate. Corolla white, campanulate, 5–7 mm long, glabrous outside, 5-lobed; lobes ovate, ca. 2 mm long. Stamens 10, ca. 1.5 mm long; filaments linear, flattened, pilose or glabrous; anthers ovate, with 2 recurved awns ca. 1 mm long. Ovary glabrous. Capsule not seen. Flowering August.

Distribution and ecology. China, western Yunnan Province. Alpine meadows among moss on rocks; ca. 3600 m.

Cassiope membranifolia appears to be closely related to *C. myosuroides* W. W. Smith, which has a similar membranous leaf blade margin. It differs in that the leaf margin is membranous with the distal portion of the rim forming a hyaline elongated-triangular acumen, and in the leaf blades being suborbicular, rarely elliptic, adaxially concave, roughened, and abaxially subglabrous.

Paratypes. CHINA. **Yunnan:** without locality, *G. Forrest 7982* (A); Lushui Xian, *Bijiang Exped. 1772* (KUN).

Enkianthus deflexus (Griffith) C. K. Schneider var. **glabrescens** R. C. Fang, var. nov. TYPE: China. Gansu: Wen Xian, 1640 m, 21 July 1991, *Y. F. Wang & X. L. Chen 911007* (holotype, MO).

A var. *deflexo* foliis utrinque glabrescentibus vel abaxialiter ad costas sparse hispidulis; petiolis glabris; rhachidibus et pedicellis pubescentibus et pilis glanduliferis obtectis differt.

Enkianthus deflexus var. *glabrescens* differs from variety *deflexus* in having leaf blades glabrescent on both surfaces or abaxially sparsely hispidulous along the midrib, glabrous petioles, and glandular-pubescent rachises and pedicels. Except for this new variety, all of the other Chinese taxa of *Enkianthus* are found in provinces south of the Changjing (Yangtze River).

Enkianthus serrulatus (Wilson) C. K. Schneider var. **sichuanensis** (T. Z. Hsu) R. C. Fang, stat. et comb. nov. Basionym: *Enkianthus sichuanensis* T. Z. Hsu, Acta Bot. Yunnan. 4: 358. 1982. TYPE: China. Sichuan: Fengjie Xian, *M. Y. Fang 24515* (holotype, HIB not seen; isotype, KUN).

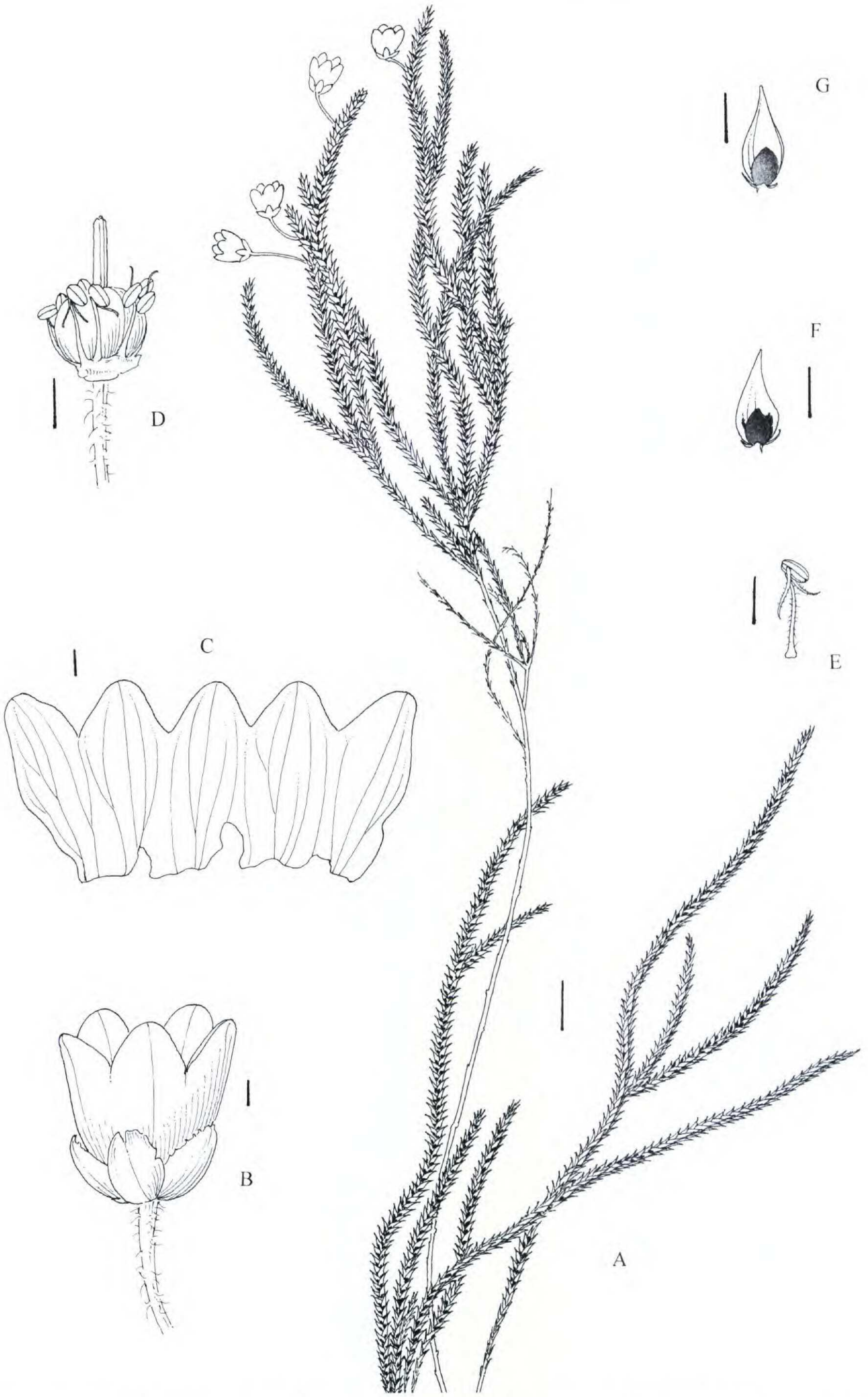


Figure 1. *Cassiope membranifolia* R. C. Fang. —A. Habit. —B. Flower. —C. Opened corolla. —D. Stamens and pistil. —E. Stamen. —F. Adaxial leaf surface. —G. Abaxial leaf surface. Scale bars: A = 1 cm, B–G = 1 mm. Drawn from holotype (*S. G. Wu 8423*).

Enkianthus sichuanensis was based on a single collection, which is indistinguishable from material of *E. serrulatus*, except for the hairy ovary. *Enkianthus sichuanensis* is reduced to a variety of *E. serrulatus* since the type collection of the former was collected from within the range of the latter.

Gaultheria brevistipes (C. Y. Wu & T. Z. Hsu) R. C. Fang, comb. nov. Basionym: *Leucothoe brevistipes* C. Y. Wu & T. Z. Hsu, Act. Phytotax. Sin. 23: 315. 1985. *Leucothoe griffithiana* C. B. Clarke var. *sessilifolia* C. Y. Wu & T. Z. Hsu, Fl. Xizang. 3: 684. 1986. TYPE: China. Xizang: Medog, *Qinghai-Xizang Complex Exped. 74-3951* (holotype, KUN).

Both *Leucothoe brevistipes* and *L. griffithiana* var. *sessilifolia* are based on the same collection number. Hsu (1991) incorrectly listed the species as *L. sessilifolia* C. Y. Wu & T. Z. Hsu [sic] with the exact bibliographical citation of *L. brevistipes*, and cited *L. griffithiana* var. *sessilifolia* as a synonym.

Additional specimens examined. CHINA. **Xizang:** Medog, *B. S. Li & S. Z. Cheng 1289, 2496, 3358, 3741, 4757, 5082* (KUN), *H. Sun, Z. K. Zhou & H. Y. Yu* 516, *2751, 3655, 3713, 4827* (KUN).

Gaultheria dumicola W. W. Smith var. **hirticaulis** R. C. Fang, var. nov. TYPE: China. SE Yunnan: Malipo Xian, 2000 m, 6 Dec. 1962, *Q. A. Wu 62–134* (holotype, KUN).

A var. *dumicola* recedit caulibus densissime brunneo-hirsutis, foliis subtus hispidis.

Juvenile and adult branches densely brown-hirsute. Leaf blade ovate, 3–8 × 2–4 cm, base rotund to broadly cuneate, adaxially glabrous, abaxially short brown-hispid.

This new variety is readily distinguished from the other varieties of *Gaultheria dumicola* by having densely brown-hirsute juvenile and adult branches. All of the remaining varieties of *G. dumicola* have glabrous leaves, except for variety *aspera* Airy-Shaw, which has abaxially hispid leaf blades.

Gaultheria griffithiana Wight var. **insignis** R. C. Fang, var. nov. TYPE: China. SE Xizang: Zayu Xian, 2800 m, 18 July 1973, *Qinghai-Xizang Complex Exped. 73-781* (holotype, KUN; isotype, PE).

A var. *griffithiana* recedit rhachidibus robustis, lanuginosis; pedicellis robustis, tomentosis; bracteis rotundo-ovatis, 5–7 mm longis, extus inferne et intus omnino densissime sericeis; calycibus intus densissime sericeis.

Plants robust, 1–1.2 m tall. Stems narrowly winged. Leaf blade oblong or narrowly ovate, 13–14 × 4.5–6 cm, base subcordate, apex short caudate. Racemes 4–5 cm long; rachis robust, lanuginose; pedicels robust, 6–9 mm long, tomentose; bracts fulvous, rotund-ovate, 5–7 mm long, densely sericeous adaxially and abaxially below.

Gaultheria griffithiana var. *insignis* is most easily distinguished from variety *griffithiana* by having lanuginose rachises, tomentose pedicels, densely sericeous bracts and calyx interiors, and subcordate bases of the leaf blades. By contrast, variety *griffithiana* has pubescent rachises and pedicels, subglabrous bracts and calyx interiors, and obtuse-rounded bases of the leaf blades.

Gaultheria heteromera R. C. Fang, sp. nov. TYPE: China. Xizang: Medog Xian, 3900 m, 1 Aug. 1974, *Qinghai-Xizang Complex Exped. 74–3876* (holotype, KUN; isotypes, KUN, PE). Figure 2.

Species nova *G. prostratae* W. W. Smith affinis, sed calycibus tetrasepalis, corollis globoso-urceolatis, ramulis puberulis et hirtellis. A *G. pyrolaefolia* J. D. Hooker ex C. B. Clarke foliis parvioribus, ovariis hispidulis, calycibus tetrasepalis differt.

Small shrubs, ca. 10 cm tall. Stems procumbent, terete, slender, branchlets densely puberulent mixed with long brown hairs. Leaves scattered along stem; petioles ca. 1 mm long, glabrous or sparsely hirtellous; leaf blades elliptic, 0.8–1.7(–2.5) × 0.6–1 cm, chartaceous, base broadly cuneate, margin dentate, teeth apiculate, apex obtuse to acute, mucronulate, both surfaces drying brown, glabrous or sparsely hirtellous abaxially; veins slender, secondary ones in 3 pairs, ultimate veinlets conspicuous, all immersed adaxially, raised abaxially. Inflorescences shortly racemose, terminal or axillary on branchlet apices, 1–4-flowered; rachis 3–6 mm long, puberulent; bracts broadly ovate, 1.5–2 mm long, glabrous. Pedicels 4–6 mm long, puberulent; bracteoles 1 or 2 pairs, at middle or upper part of pedicel, somewhat remote from calyx, ovate, 1–1.5 mm long, glabrous. Calyx glabrous; lobes 4, triangular-ovate, 2.5–3 mm long. Corolla white, globose-urceolate, ca. 4 mm long, glabrous abaxially; lobes 4, very short, reflexed. Stamens 8 or 9, ca. 2 mm long; filaments dilated basally, glabrous, papillose; theca 2-aristate. Ovary hispidulous. Capsule unknown.

Distribution and ecology. China, southeastern Xizang. Alpine cushion thicket meadows; ca. 3900 m.

Gaultheria heteromera is closely related to *G. prostrata* W. W. Smith from which it differs by having a 4-lobed calyx, a globose-urceolate corolla,

Figure 2. *Gaultheria heteromera* R. C. Fang. —A. Habit. —B. Flower with two pairs of bracteoles. —C. Abaxial leaf surface. —D. Opened calyx showing pistil. —E. Stamen ventral view. —F. Stamen dorsal view. Scale bars: A = 1 cm, B, D–F = 1 mm, C = 5 mm. Drawn from holotype (*Qinghai-Xizang Complex Exped. 74-3876*).

and puberulent and hirtellous branchlets. *Gaultheria prostrata* has a 5-lobed calyx, a broadly campanulate corolla, and pubescent branches that become glabrescent and cinereous with age. *Gaultheria heteromera* differs from the closely related *G. pyrolaefolia* in having smaller leaves (0.8–1.7(–2.5) × 0.6–1 cm vs. 1.3–5 × 0.8–2.5 cm), a 4- instead of 5-lobed calyx, and hairy instead of glabrous ovary.

Paratypes. CHINA. **Xizang:** Medog, *Qinghai-Xizang Complex Exped. 74-3896* (KUN, PE).

Gaultheria jingdongensis R. C. Fang, sp. nov. TYPE: China. WC Yunnan: Jingdong Xian, 2700 m, 1 May 1959, *S. G. Wu 4774* (holotype, KUN; isotype, KUN). Figure 3.

Proxima *G. trichophyllae* Royle, sed foliis majoribus, subtus dense hispidulis, margine setis caducis, floribus persaepe majoribus, lobis calycis 3–5 mm longis, dense ciliolatis, corollis 6–9 mm longis, profunde divisis, lobis 3–6 mm longis differt.

Small shrubs, ca. 15 cm tall. Stems slender, terete, slightly prostrate, densely cinnamon- or brown-hirsute. Petioles 1–2 mm long, hirsute; leaf blades obovate-oblong, 1–2 × 0.5–1 cm, chartaceous to coriaceous, base cuneate-attenuate, margin denticulate, teeth setose or setae caducous, apex obtuse or rotund, mucronate, adaxially drying brown-green, glabrous, abaxially cinnamon to brown, densely hispidulous; midrib slightly raised below, secondary veins and ultimate veinlets obscure on both surfaces. Flower solitary, axillary; pedicels 2–3 mm long, hirtellous; bracts lacking; bracteoles 2, broadly ovate, ca. 3 mm long, coriaceous, cucullate, close to calyx, glabrous. Calyx lobes unequal, triangular-ovate, 3–5 mm long, densely white ciliolate. Corolla white, 6–9 mm long, deeply 5-lobed; lobes oblong-ovate, 3–6 mm long, erect or apically recurved. Stamens ca. 3 mm long; filaments ca. 1.5 mm long, rhomboid, glabrous, papillose; thecae 1-aristate. Ovary glabrous. Fruit unknown.

Distribution and ecology. China, west-central Yunnan. Shrub forests or roadsides on slopes; ca. 2700 m.

Gaultheria jingdongensis differs from the related *G. trichophylla* in having larger (10–20 × 5–10 mm vs. 5–13 × 2–5 mm) leaves, abaxially densely hispidulous instead of glabrous leaf blades, and caducous setae instead of persistently long-ciliate leaf margins. The flowers are also larger. The densely ciliate calyx lobes are 3–5 mm long instead of glabrous and 2–2.8 mm long. *Gaultheria jingdongensis* also has a larger corolla (6–9 mm vs. ca. 6 mm long) with lobes 3–6 instead of 2–3 mm long.

Paratypes. CHINA. **Yunnan:** Jingdong, *M. K. Li 3545* (KUN), *B. Y. Qiu 52915* (KUN), *Q. A. Wu 9234* (KUN), *Q. A. Wu 9399* (KUN).

Gaultheria leucocarpa Blume var. **psilocarpa** (H. F. Copeland) R. C. Fang, stat. et comb. nov. Basionym: *Gaultheria psilocarpa* H. F. Copeland, Philipp. J. Sci. 47: 62. 1932. TYPE: Philippines. Mindanao, Bukidnon Province, Bur. Sci. 38903, *Ramos & Edano* (holotype, M? (not seen) or PNH? (not seen); isotype, A).

Gaultheria leucocarpa Blume var. **yunnanensis** (Franchet) T. Z. Hsu & R. C. Fang, stat. et comb. nov. Basionym: *Vaccinium yunnanense* Franchet, J. Bot. (Morot) 9: 368. 1895. TYPE: China. Yunnan: Tchen-fong-chan (Cheng-feng-shan), *J. M. Delavay 3069* (holotype, P).

KEY TO THE VARIETIES OF *GAULTHERIA LEUCOCARPA*

1a. Ovary and filaments glabrous; stems sparsely puberulent and glandular-pilose or glabrous; China (Taiwan), Philippines . . . . . var. *psilocarpa* (H. F. Copeland) R. C. Fang

1b. Ovary sericeous, filaments variously hairy; stems glabrous or variously hairy.

2a. Mature fruit white; horns of anther tubes 0.3 mm long; Malay Peninsula, Java . . . . . var. *leucocarpa*

2b. Mature fruit black, blue, or black-purple; horns of anther tubes 0.5 mm long.

3a. Stems and leaves glabrous; China (Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Sichuan, Taiwan, Yunnan), Indo-Chinese Peninsula . . . var. *yunnanensis* (Franchet) T. Z. Hsu & R. C. Fang

3b. Stems and flowering branches hairy.

4a. Stems, petioles, rachis or pedicels glandular-hirsute; leaf blade abaxially short-hispid, sometimes adaxially glandular-hirsute, margin setaceous-ciliate; China (Guangxi, C and SE Yunnan) . . . . . var. *crenulata* (Kurz) T. Z. Hsu

4b. Stems with glandular bristles, rachis and pedicels glabrous, leaf blade margin spinulate-serrulate or calloso-serrulate, glabrous; Philippines . . . . . var. *cumingiana* (Vidal) T. Z. Hsu

Gaultheria longibracteolata R. C. Fang, sp. nov. TYPE: China. S Yunnan: Luchun Xian, 1700 m, 17 Sep. 1973, *D. D. Tao 68* (holotype, KUN; isotype, KUN). Figure 4.

Species valde affinis *G. discolori* Nuttall ex J. D. Hook-

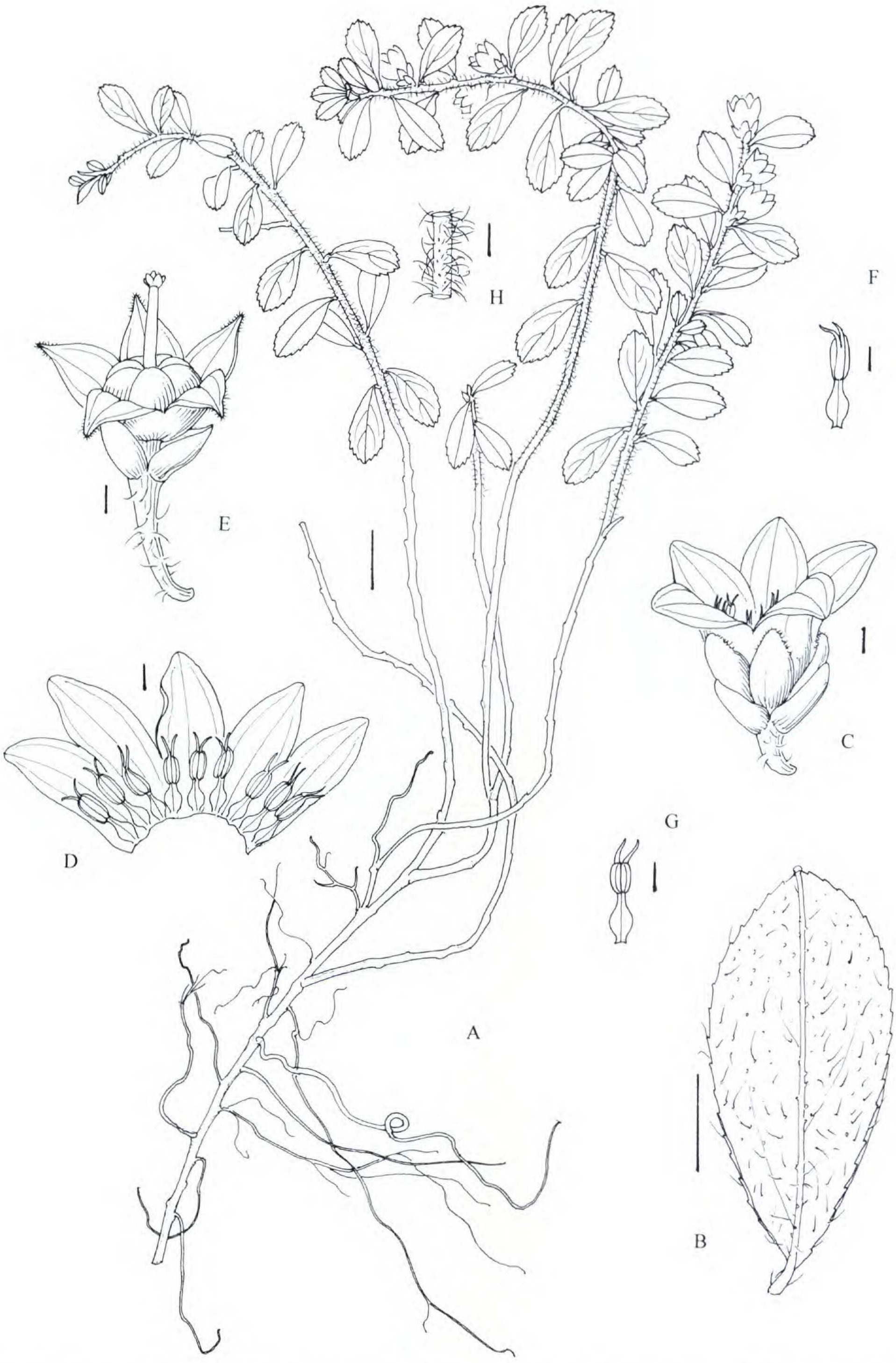


Figure 3. *Gaultheria jingdongensis* R. C. Fang. —A. Habit. —B. Abaxial leaf surface. —C. Flower with bracteoles. —D. Opened corolla showing stamens. —E. Pistil, calyx, and bracteoles. —F. Stamen dorsal view. —G. Stamen ventral view. —H. Portion of stem. Scale bars: A = 1 cm, B = 5 mm, C–G = 1 mm, H = 4 mm. Drawn from holotype (*S. G. Wu 4774*).

Figure 4. *Gaultheria longibracteolata* R. C. Fang. —A. Habit. —B. Abaxial leaf surface. —C. Portion of stem. —D. Flower with bracteoles. —E. Capsule with persistent calyx and bracteoles. —F. Bract. —G. Stamen ventral view. Scale bars: A, B = 1 cm, C = 6 mm, D–G = 1 mm. Drawn from holotype (*D. D. Tao 68*).

er, sed ramulis dense hispidis et puberulis, foliis subtus appresse-setulosis, stylis pilosis, capsulis calycibus carmesinis vel purpureis tectis, aristis antherae 0.8 mm longis, non bicuspidatis differt, et a *G. straminea* R. C. Fang differt foliis ellipticis vel oblongo-ellipticis, bracteolatis calycem subaequantibus, stylis pilosis, capsulis calycibus carmesinis vel purpureis tectis.

Shrubs ca. 50 cm tall. Stems terete, slender angular, densely brown hispid and puberulent. Petioles red, 2–4 mm long, slightly hispid; leaf blades elliptic or oblong-elliptic, 2.5–5 × 1–2 cm, thin coriaceous, base broadly cuneate to obtuse, margin dentate, recurved, apex acute to obutse, mucronulate, adaxially drying gray-green, glabrous, abaxially silvery-white, drying gray-white or pale brown, sparsely and distinctly appressed-setulose; secondary veins 2 or 3 pairs, ultimate veinlets obscure. Inflorescences from axils of upper leaves and terminal, ca. 2.5 cm long; rachis densely pubescent; bracts orbicular-ovate, 4–5 mm long, margin fimbrillate, abaxially subglabrous, adaxially pubescent. Pedicels 3–4 mm long, densely pubescent; bracteoles 2, ovate, similar to bract, ca. 5 mm long, close to calyx. Calyx pink, 4–5 mm long, glabrous abaxially, pubescent adaxially; lobes oblong-ovate, 2.5–3 mm long, ciliolate, apex apiculate. Corolla white, urceolate, ca. 6 mm long, glabrous outside, upper part of inside pilose; lobes ovate-triangular, ca. 0.8 mm long. Stamens 10, ca. 3 mm long; filaments flattened, adaxially glabrous, abaxially pilose; thecae with 2 long aristae ca. 0.8 mm long. Ovary tomentose; style pilose. Fruit globose, ca. 5 mm diam.; capsule enclosed by crimson or purple-green mucronate calyx. Flowering June–September, fruiting August–October.

Distribution and ecology. China (southern Yunnan Province) to Thailand. Evergreen forest margins, on open slopes or among thickets; 1200–2000(–2700) m.

Gaultheria longibracteolata is most closely related to the Bhutanese *G. discolor* Nuttall ex J. D. Hooker and Tibetan *G. straminea* (C. Y. Wu & T. Z. Hsu) R. C. Fang, which it resembles in the outline of the leaf blade, few lateral veins, and grayish white or silvery-white abaxial leaf surface. It differs from *G. discolor* by having densely hispid and puberulent branchlets, abaxially sparsely appressed-setulose leaf blades, pilose styles, and anthers with aristae ca. 0.8 mm long. It differs from *G. straminea* by having elliptic or oblong-elliptic instead of oblong-lanceolate leaf blades, bracteoles almost as long as instead of shorter than calyx, pilose instead of glabrous styles, and capsules enclosed by a crimson or purplish instead of white calyx.

Paratypes. CHINA. **Yunnan:** Yuanyang Xian, Feng Chen Lin, *A. Henry 9460B* (A); without locality, *A. Henry 9460C* (A); Kuan Yin Shan, Red River from Manmei, 6000 ft., *A. Henry 9761* (A); Wenshan Xian, *H. T. Tsai 51543* (A, KUN); Mienning (Lincang Xian), *T. T. Yü 17726* (KUN); Jingdong Xian, *M. K. Li 1792* (KUN); Lincang Xian, *J. S. Xin 601* (KUN); Xingping Xian, *S. G. Wu 474* (KUN); Yuanjiang Xian, *S. G. Wu 761* (KUN); Wenshan Xian, *S. G. Wu 61-3832* (KUN); Mengla Xian, *Z. H. Tsi 91-214* (A); Jingdon Xian, *H. Peng & B. Bai 649* (KUN); Luchun Xian, *S. G. Wu, Y. M. Shui, J. Murata et al. 47, 861, 2577* (KUN, MAK). THAILAND. **Chiang Mai:** Doi, Intanon National Park, *J. F. Maxwell 89-1613* (A).

Gaultheria pseudonotabilis H. Li ex R. C. Fang, sp. nov. TYPE: China. NW Yunnan: Gongshan Xian, Dulongjian region, 1350 m, 9 Mar. 1991, *Dulongjian Bot. Exped. 4446* (holotype, KUN; isotype, KUN). Figure 5.

Species valde affinis *G. notabili* Anthony, sed foliis majoribus, 8–15 × 3–7 cm, basi cordato-rotundatis, floribus rubris, filamentis glabris differt.

Shrubs 1–2(–3) m tall. Stems terete, densely and patently ferrugineous-setose, setae 2–5 mm long. Petioles 3–7 mm long, densely and patently ferrugineous-setose; leaf blades elliptic-ovate, ovate, or oblong-lanceolate, (5–)8–15 × 3–7 cm, chartaceous-coriaceous, base shallowly cordate to rounded, margin sparsely dentate, slightly revolute, densely setiform-ciliate, apex acuminate, caudate, or acute, adaxially bullate, glabrous, abaxially sparsely long setose along midrib and secondary veins, otherwise glabrous; veins adpressed adaxially, distinctly raised abaxially, secondary veins in 2 pairs arising from leaf base. Inflorescences shortly corymbose-racemose, axillary; rachises 2–8 mm long, glabrous; bracts leathery, rhomboid-triangular, 2–4 mm long, glabrous, ciliolate. Pedicels 0.8–1.2 cm long, glabrous; bracteoles 2, basal, similar to bracts but smaller. Calyx cupular, 4–5 mm long; lobes triangular, 2.5–3 mm long, glabrous. Corolla red, broadly campanulate, 7–9 mm long, glabrous outside; lobes triangular-ovate, 3–5 mm broad. Stamens 10, 3–4 mm long; filaments 1.5–2 mm long, glabrous, papillose, base dilated; thecae 2–2.5 mm long, shortly 2-aristate. Ovary glabrous. Fruit depressed globose, ca. 5 mm diam.; capsules enclosed by dark purple calyx. Flowering March, fruiting May.

Distribution and ecology. China, northwestern Yunnan Province. Under evergreen broad-leaved forest, on rocks or among thickets; 1300–2000 m.

Gaultheria pseudonotabilis is allied to and more robust than *G. notabilis* Anthony. Most of the essential characters and geography of the two are basically the same. *Gaultheria notabilis* is a subshrub

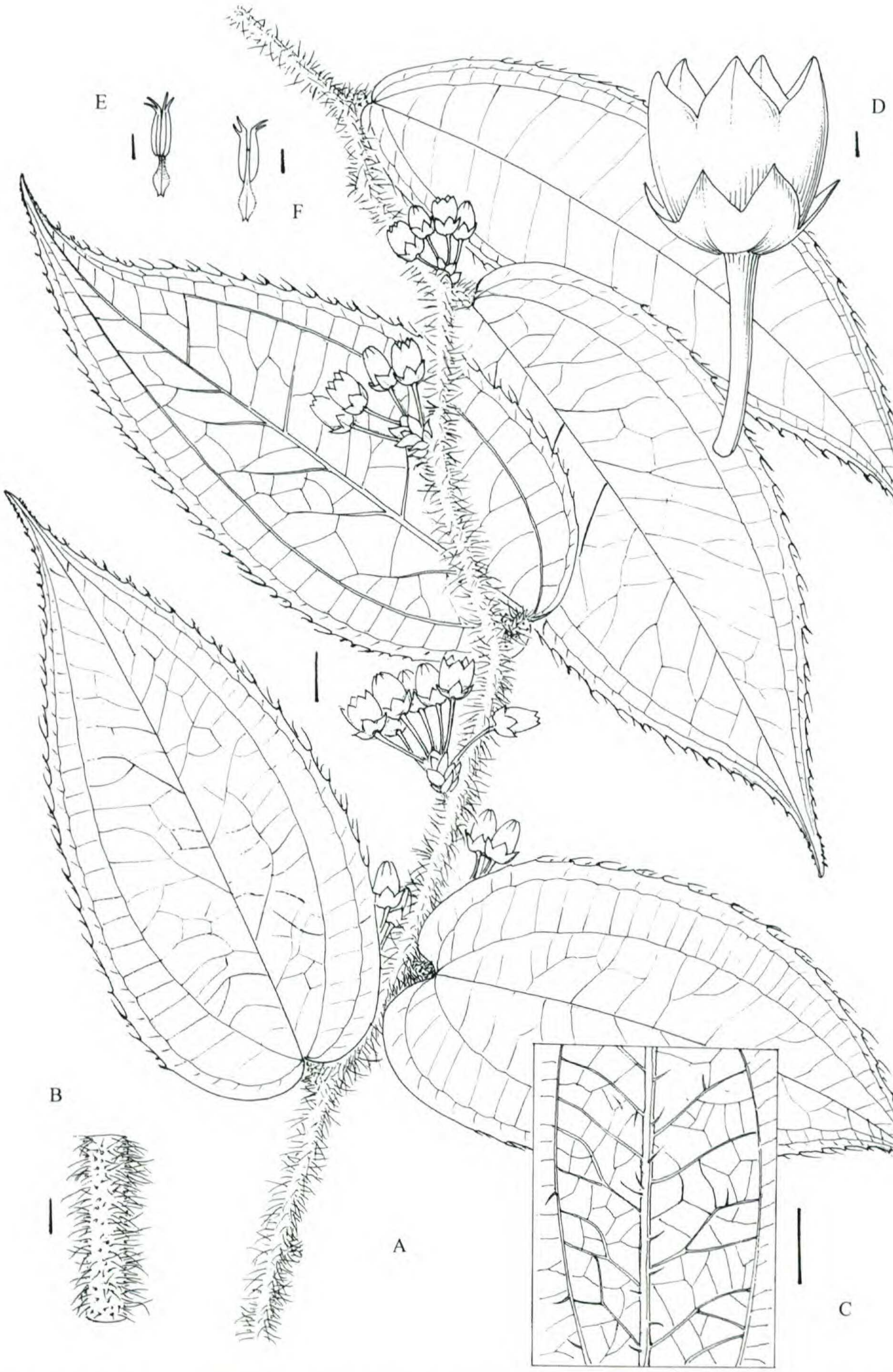


Figure 5. *Gaultheria pseudonotabilis* H. Li ex R. C. Fang. —A. Habit. —B. Portion of stem. —C. Portion of abaxial leaf surface. —D. Flower. —E. Stamen ventral view. —F. Stamen dorsal view. Scale bars: A, C = 1 cm, B = 4 mm, D–F = 1 mm. Drawn from holotype (*Dulongjian Bot. Exped. 4446*).

30–40 cm tall with leaves 2–3.5 × 1.5–2 cm, bracts 1–2 mm long, pedicels ca. 6 mm long, calyx lobes ca. 3 mm long, and corolla lobes 2–3 mm long. *Gaultheria pseudonotabilis* can be separated from the related *G. codonantha* Airy-Shaw by its adaxially glabrous instead of densely short setulose leaf blades, abaxially sparsely long setose instead of very densely ferrugineous-setulose especially along the midrib and secondary veins, glabrous instead of densely tomentose bracts and inflorescence rachises, short (2–8 mm vs. 10–40 mm) rachises, and red instead of white flowers.

The name *Gaultheria pseudonotabilis* first appeared as a nomen nudum in Li (1993), and is herein validated.

Paratypes. CHINA. **Yunnan:** Gongshan Xian, *K. M. Feng 24731* (KUN), *Q. Lin & X. F. Deng 79-1170* (KUN), *Qinghai-Xizang Complex Exped. 8144* (KUN, PE), *Dulongjian Bot. Exped. 915, 3149, 3406, 4152, 4115, 4208, 4231, 4634, 4669, 5395, 6738, 7013* (KUN).

Gaultheria purpurea R. C. Fang, sp. nov. TYPE: China. Xizang: Medog Xian, 2400 m, 2 Dec. 1982, *B. S. Li & S. Z. Cheng 1994* (holotype, KUN; isotype, PE). Figure 6.

Haec species differt a congeneris foliis in sicco subtus purpuratis, secus costas, nervos laterales et reticulationes dense hirsutis, racemis summis caulis, pedunculis 3.5–4.5 cm longis.

Shrublets, 5–10 cm tall. Stems procumbent, terete, slender, branchlets slightly puberulent, densely brown hirsute. Leaves scattered; petioles 1–2 mm long, hirsute; leaf blades elliptic, 1.5–3 × 1–2 cm, coriaceous, base broadly cuneate to rotund, margin denticulate, teeth setose, apex obtuse to acute, mucronulate, adaxially drying gray-green, glabrous, abaxially purple, hirsute along veins; secondary veins 3–5 on each side of midrib, midrib, secondary veins, and ultimate veinlets immersed adaxially and raised abaxially. Inflorescences racemose, on branchlet apices, terminal or axillary, 5–7 cm long in fruit; peduncle 3.5–4.5 cm long, glabrous; rachises glabrous; bracts ovate, coriaceous, 2–3 mm long, glabrous. Bracteoles 2, at middle or upper part of pedicel, ovate-triangular, ca. 2 mm long, ciliolate. Calyx glabrous; lobes triangular-ovate, 1.5–2 mm long, ciliolate. Corolla and stamens not seen. Ovary hispidulous. Fruit globose, 6–7 mm diam.; capsule enclosed by dark purple fleshy calyx; fruit stalk 4–9 mm long, glabrous. Fruiting November–December.

Distribution and ecology. China (southeastern Xizang). On rocky slopes near the summit of mountain; 2000–3400 m.

Gaultheria purpurea is readily distinguished from the other Chinese species of the genus by having purple, hirsute leaves, terminal or axillary inflorescences on branchlet apices, and peduncles 3.5–4.5 cm long.

Paratypes. CHINA. **Xizang:** Medog, *B. S. Li & S. Z. Cheng 1862* (KUN, PE).

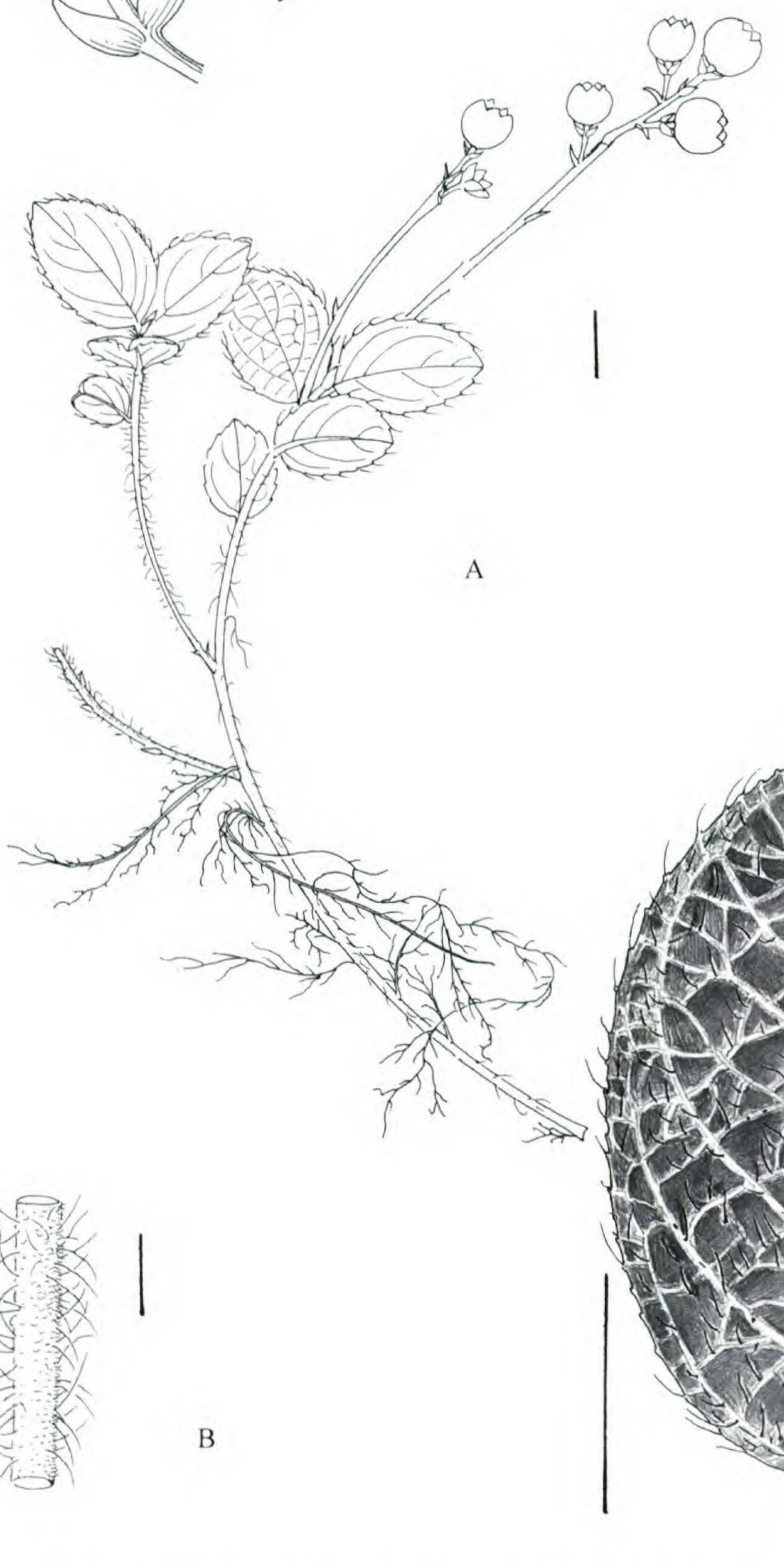
Gaultheria straminea R. C. Fang, nom. nov. Replaced name: *Gaultheria wardii* Marquand & Airy-Shaw var. *serrulata* C. Y. Wu & T. Z. Hsu, Fl. Xizang. 3: 699. 1986; not *G. serrulata* Herzog, Meded. Herb. Leiden 27: 19. 1915; not *G. serrulata* Danguy & Chernt., Bull. Mus. Hist. Nat. Paris 28: 435. 1922. TYPE: China. Xizang: Medog Xian, 1700 m, *Qinghai-Xizang Complex Exped. 73-890* (holotype, KUN). Figure 7.

Shrubs, 1–1.5 m tall. Stems brown, terete; branchlets angular, rather slender, densely brown-hispid and puberulent. Leaves scattered; petiole 4–5 mm long, hispid, puberulent or glabrous; leaf blades oblong-lanceolate or elliptic, 4–7 × 1–2.5 cm, coriaceous, base cuneate or broadly cuneate, margin dentate, apex acuminate or acute, mucronulate, adaxially drying gray-green to dark green, glabrous, abaxially stramineous, appressed setulose; secondary veins 3 or 4 pairs, ultimate veinlets slightly distinct. Inflorescences racemose, axillary and terminal, 1.5–3.5 cm long; rachises densely pubescent; bracts ovate, 3–4 mm long, both surfaces puberulent, ciliolate. Pedicels 1–2 mm long, densely pubescent; bracteoles 2, 2–3 mm long, close but not touching calyx, abaxially puberulent, margins membranous, ciliolate, adaxially glabrous. Calyx ca. 3 mm long, both surfaces puberulent; lobes subulate-triangular, ca. 2 mm long, ciliolate. Corolla white, urceolate, 3–4 mm long, glabrous outside, pilose inside; lobes very short, ovate-triangular. Stamens 10, ca. 1.5 mm long; filaments flattened, spindle-shaped, papillose; thecae short 2-aristate. Ovary tomentose; style glabrous. Fruit globose, 4–5 mm diam.; capsules enclosed by white, rugose calyx. Flowering August–October, fruiting October–March.

Distribution and ecology. China, Xizang. Flood plains, among *Salix* scrub forests, evergreen forest margins or on slopes; 600–2100 m.

Specimens examined. CHINA. **Xizang:** Medog Xian, *Qinghai-Xizang Complex Exped. 1682* (KUN, PE), *Qinghai-Xizang Complex Exped. 74-1712* (KUN, PE), *Qinghai-Xizang Complex Exped. 74-4535* (KUN, PE), *B. S. Li & S. Z. Cheng 973, 1471, 1788, 1907, 2261, 2991, 3125, 3527* (KUN, PE), *H. Sun, Z. K. Zhou & H. Y. Yu 221,*

D



A

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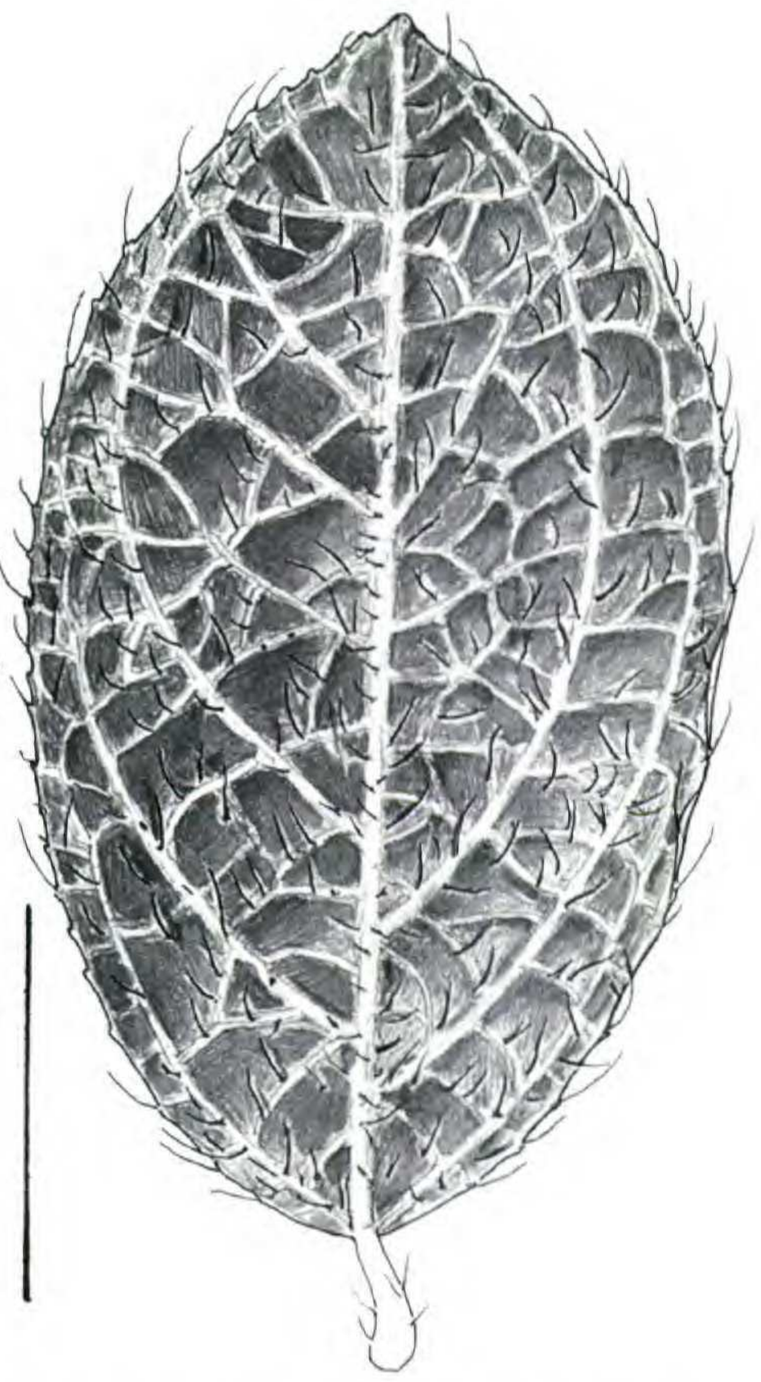

Figure 6. *Gaultheria purpurea* R. C. Fang. —A. Habit. —B. Portion of stem. —C. Leaf abaxial surface. —D. Young capsule with persistent calyx and bracteoles Scale bars: A, C = 1 cm, B = 4 mm, D = 1 mm. Drawn from holotype (*B. S. Li & S. Z. Cheng 1994*).

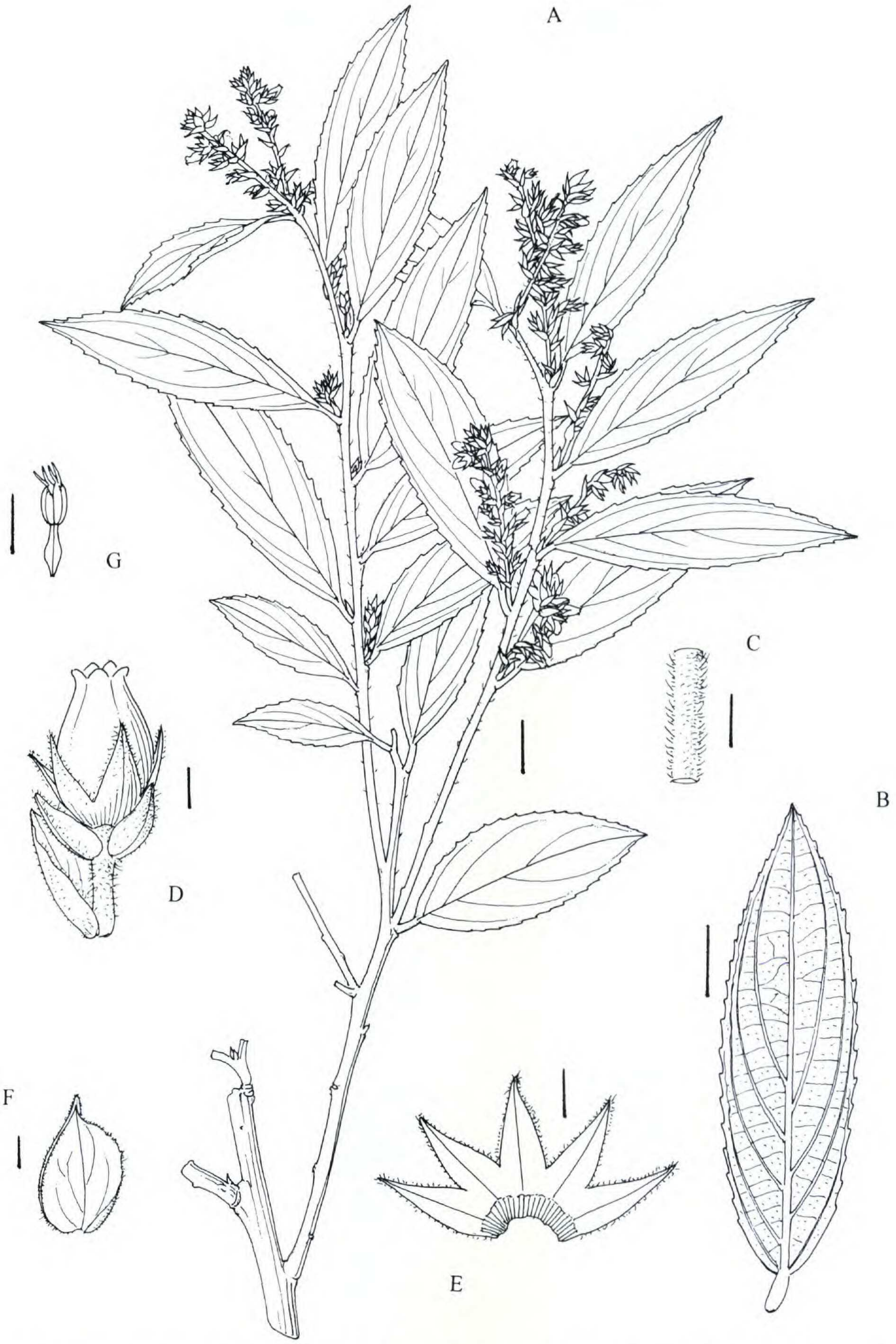

Figure 7. *Gaultheria straminea* R. C. Fang. —A. Habit. —B. Abaxial leaf surface. —C. Portion of stem. —D. Flower with bract and bracteoles. —E. Opened calyx. —F. Bract. —G. Stamen ventral view. Scale bars: A, B = 1 cm, C = 4 mm, D–G = 1 mm. Drawn from *Li & Cheng 973* (KUN).

230, 1832, 2335, 2553, 2787, 4203, 4242, 4872, 6070 (KUN).

Gaultheria straminea is closely related to the Bhutanese *G. discolor* from which it differs in having densely brown-hispid and puberulent branchlets, abaxially appressed setulose leaf blades, 3 or 4 secondary veins on each side of the midrib, densely pubescent rachises and pedicels, and papillose filaments. It can be distinguished from the related *G. longibracteolata* by having the bracteoles at some distance from instead of adjacent to the calyx, subulate-triangular instead of oblong-ovate calyx lobes, glabrous instead of pilose styles, and capsules enclosed by a white and rugose instead of crimson, purplish green, or purple-black glaucous calyx.

Gaultheria trigonoclada R. C. Fang, sp. nov. TYPE: China. Xizang: Medog Xian, 2300 m, 26 Oct. 1992, *H. Sun, Z. K. Zhou & H. Y. Yu 550* (holotype, KUN; isotype, KUN). Figure 8.

Species valde insignis ramulis trigonis usque ad alatos, glabris, foliis rhombico-ellipticis vel ellipticis, nervis lateralibus 2-jugis, inflorescentiis foliis multo brevibus, floribus densis, bracteis et bracteolatis carinatis, 1 costis omnibus.

Shrubs, 1–2 m tall. Stems brownish, slightly 3-angled, branchlets distinctly 3-angled or with narrow wings, glabrous. Petioles 5–10 mm long, glabrous; leaf blades elliptic or rhombic-elliptic, 4–8.5 × 2.5–4 cm, thick coriaceous, base cuneate, margin dentate, apex acute to acuminate, adaxially glabrous, abaxially sparsely shortly brown glandular-setose; secondary veins 2 on each side of midrib, ultimate veinlets subparallel, impressed adaxially, raised abaxially. Inflorescences racemose, axillary, 2–3 cm long; rachis angular, densely pubescent; bracts ovate-lanceolate, carinate, 5–6 mm long, coriaceous, distinctly 1-costate, both surfaces glabrous or puberulent abaxially. Pedicels 2–4 mm long, pubescent; bracteoles 2, similar to bracts, ovate, ca. 3 mm long, close to calyx. Calyx 2.5–3 mm long, divided to near base; lobes triangular-lanceolate, glabrous. Corolla white, urceolate, ca. 5 mm long, glabrous outside, pilose inside; lobes triangular-ovate, ca. 0.5 mm long. Stamens 10, ca. 2 mm long; filaments flattened, dilated below middle, papillose; thecae with 2 slender aristae. Ovary tomentose; styles as long as stamens. Capsules globose, 4–6 mm diam., enclosed by a purple calyx. Flowering October, fruiting June–August.

Distribution and ecology. China, southeastern Xizang. Forests, river terraces among thickets; 2000–2300 m.

Gaultheria trigonoclada is readily distinguished from the other Chinese species of the genus by its trigonous or winged, glabrous branchlets, rhombic-elliptic or elliptic leaves with 2 secondary veins on each side of the midrib, short and densely flowered inflorescences, and carinate, 1-costate bracts and bracteoles.

Paratypes. CHINA. **Xizang:** Medog, 2300 m, 3 Aug. 1974, *Qinghai-Xizang Complex Exped. 74-3955* (KUN, PE), *B. S. Li & S. Z. Cheng 5081* (KUN, PE).

Gaultheria wardii Marquand & Airy-Shaw var. **elongata** R. C. Fang, var. nov. TYPE: China. Yunnan: Gongshan Xian, 2000 m, 28 July 1982, *Qinghai-Xizang Complex Exped. 8858* (holotype, KUN; isotypes, KUN, PE).

A var. *wardii* rhachidi elongata, floribus vel fructibus distantibus in rhachidi, rhachidi visibili, calycibus glabris extra, bracteis et bracteolis subglabris differt.

Gaultheria wardii var. *elongata* differs from variety *wardii* by its elongated rachises, flowers or fruits distant and the rachises distinctly visible, and calyx, bracts, and bracteoles subglabrous abaxially. By contrast, variety *wardii* has shortened rachises, crowded flowers and fruits and the rachises invisible, and calyx, bracts, and bracteoles densely sericeous or velutinous abaxially.

Paratypes. CHINA. **Yunnan:** Gongshan Xian, *T. T. Yü 21060* (KUN), *Qinghai-Xizang Complex Exped. 8925* (KUN, PE); Dulongjian Valley, *Dulongjian Bot. Exped. 826, 1087, 1368, 1441, 1608, 1941, 3210, 4255, 4788, 4955, 5082, 5160, 6981* (KUN).

Vaccinium rubescens R. C. Fang, sp. nov. TYPE: China. W Yunnan: Ximeng Xian, 2000 m, 8 Mar. 1958, *Y. C. Du D580156* (holotype, KUN; isotype, KUN). Figure 9.

Species nova *V. ardisioidi* J. D. Hooker & C. B. Clarke valde affinis, sed foliis oblongo-lanceolatis vel oblongo-ovatis, pedicellis rubris et clavatis, corollis rubris, tubulosis, filamentis pubescentibus, antheris calcaribus valde brevibus differt.

Evergreen shrubs, almost glabrous, terrestrial or epiphytic, 1–2 m tall. Branchlets terete. Leaves 3–8 in pseudoverticils, sessile; leaf blades oblong-lanceolate or oblong-ovate, 7.5–12 × 2–4 cm, chartaceous, base narrowly obtuse-rotund, subcordate, margin entire, apex acuminate; secondary veins slender, more than 15 on each side of midrib, midrib raised on both surfaces. Inflorescences racemose, 2- or 3-umbelled in whorl of leaves, 7–12 cm long, flowers numerous, secund; rachises red, angulate-winged; bracts and bracteoles wanting. Pedicels red, clavate, ca. 1.5 cm long, thickened

Figure 8. *Gaultheria trigonoclada* R. C. Fang. —A. Habit. —B. Portion of stem. —C. Inflorescence in flower showing bracts. —D. Flower with bract and bracteoles. —E. Stamen ventral view. —F. Stamen dorsal view. —G. Capsule enclosed by calyx. Scale bars: A–C = 1 cm, D–G = 1 mm. Drawn from holotype (*H. Sun, Z. K. Zhou & H. Y. Yu 550*).

Figure 9. *Vaccinium rubescens* R. C. Fang. —A. Habit. —B. Flower. —C. Opened corolla showing stamens. —D. Berry. —E. Stamen ventral view. —F. Stamen dorsal view. Scale bars: A = 1 cm, B, C, E = 1 mm, D = 2.5 mm. A–C, E, F drawn from holotype (*Y. C. Du D580156*), D drawn from *Li 4983* (KUN).

Figure 10. *Vaccinium tenuiflorum* R. C. Fang. —A. Habit. —B. Flower bud. —C. Opened corolla showing stamens. —D. Stamen ventral view. —E. Stamen dorsal view. Scale bars: A = 1 cm, B–E = 1 mm. Drawn from holotype (*H. Sun, Z. K. Zhou & H. Y. Yu 2617*).

upward, distinctly articulated with calyx. Calyx tube shortly terete, ca. 4 mm long, upper parts free, not adnate to ovary; teeth triangular, ca. 1 mm long. Corolla orange to pink, tubular, 7–8 mm long; teeth less than 1 mm long. Stamens 10, 5–7 mm long; filaments 2–4 mm long, pubescent especially at apex; anthers spinulose, with 2 short spurs; tubules as long as thecae. Berry globose, scarlet, ca. 5 mm diam.; fruit stalk scarlet, ca. 2 cm long. Flowering March, fruiting May.

Distribution and ecology. China, western Yunnan. Dense forests, roadsides, moist places; 2000–2200 m.

Vaccinium rubescens is most closely related to *V. ardisioides* J. D. Hooker ex C. B. Clarke from which it can be distinguished by the oblong-lanceolate or oblong-ovate instead of the ovate or elliptic leaves, red and clavate instead of purple and slender pedicels, orange or pink and tubular instead of white-green and urceolate-tubular corollas, pubescent instead of subglabrous filaments, and shortly 2-spurred instead of spurless anthers.

Paratypes. CHINA. **SW Yunnan:** Luxi Xian, *H. T. Tsai 56424* (KUN); Gengma Xian, *P. Y. Mao 5574* (KUN), *Y. H. Li 4983* (KUN).

Vaccinium tenuiflorum R. C. Fang, sp. nov. TYPE: China. SE Xizang: Medog Xian, 1800 m, 26 Dec. 1992, *H. Sun, Z. K. Zhou & H. Y. Yu 2617* (holotype, KUN; isotype, KUN). Figure 10.

Species nova *V. vacciniacei* (Roxburgh) Sleumer valde affinis, sed foliis coriaceis non chartaceis, 4–11 × 0.9–2 cm, pedicellis usque ad tubos calycum dense pubescentibus, corollis albis, anguste-tubulosis differt.

Evergreen shrubs or climbers. Branches scabrous, juvenile ones pubescent and shortly glandular-setose, with scattered lanceolate leaf bud scales. Leaves 9 or 10 in pseudoverticils; petioles 1–2 mm long, juvenile pubescent; leaf blades lanceolate to oblong-lanceolate, 4–11 × 0.9–2 cm, coriaceous, base narrowly cuneate or rotund, margin sparsely serrate, recurved, apex acuminate, adaxially drying dull green, abaxially olive green, both surfaces glabrous, juvenile puberulent along midrib, secondary veins 12 or 13 on each side of midrib. Inflorescences from top of branches, axillary, racemose, 5–6 cm long; rachises slender, densely pubescent, with numerous lanceolate flower bud scales at base; bracts lanceolate, 2–3 mm long, puberulent, ciliolate. Pedicels slender, 5–6 mm long, densely pubescent, slightly thickened upward, articulated with calyx; bracteoles 2, linear, ca. 1 mm long. Calyx 2–2.8 cm long, tube densely pubescent; teeth 1–1.8 mm long, triangular, pubescent or glabrous, 1-veined. Corolla white, narrowly tubular, 4–5 mm long, both surfaces glabrous except 5 pubescent ridges outside; lobes triangular, ca. 0.6 mm long. Stamens 10, shorter than corolla; filaments 0.8–1 mm long, flattened, widened at base, glabrous; anthers spinulose, without spurs, tubules longer than thecae. Berry subglobose, ca. 3 mm diam. Flowering December, fruiting April.

Distribution and ecology. China, southeastern Xizang. In forest, ca. 1800 m.

Vaccinium tenuiflorum is closely related to *V. vacciniaceum* (Roxburgh) Sleumer, from which it can be distinguished by having coriaceous leaves, densely pubescent pedicels and calyx tubes, and white and narrowly tubular corollas. *Vaccinium vacciniaceum* has chartaceous leaves, glabrous pedicels and calyx tube, and greenish yellow urceolate corollas.

Paratype. CHINA. **Xizang:** Medog Xian, *H. Sun, Z. K. Zhou & H. Y. Yu 5142* (KUN).

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